

ANALYSIS AND COMPARISON OF BODY COMPOSITION INFEMALE PHYSICAL EDUCATION STUDENTS

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ABSTRACT

This research study involved 68 female physical education students, comprising 35 from the B.P.Ed. program and 33 from the M.P.Ed. program at the Indira Gandhi Institute of Physical Education and Sports Sciences, University of Delhi, New Delhi. Body composition was assessed by measuring girth at specific body sites, including the upper arm, hip, and wrist, and considering the subjects' age. Body density was calculated using constant values derived from the measurements. The percent body fat was then estimated from body density. Statistical analysis, including descriptive statistics and t-tests, was employed to compare the body composition parameters between the two groups. The results showed no significant differences in Body Mass Index (BMI), Waist Hip Ratio (WHR), Body Fat %, Lean Body Mass (LBM), and Fat Mass between female B.P.Ed and M.P.Ed students. These findings suggest that both groups benefited from their physical education curriculum, which included regular physical activity and sports participation. Overall, this study underscores the importance of physical education programs in promoting and maintaining healthy body composition.

INTRODUCTION

The human body, along with the bodies of all other animals, primarily consists of four fundamental molecular-level components: water, fats, proteins, and minerals. Typically, these components are present in descending order of quantity. (Borga, M. et al., 2018). The concept of Body Composition serves to depict the diverse elements that collectively constitute an individual's body weight. It essentially signifies the proportion of lean tissue relative to fat within the body. Through the measurement of body composition, one can gain a more precise understanding of a person's state of health, enabling a more effective evaluation of the impacts of dietary and physical activity interventions (Shah, R Bilal et al., 2009).

Body composition analysis entails the examination of the human body by breaking down total body mass into its constituent parts. Within the realm of sports, the assessment of body composition holds significant importance. It stands as one of the critical factors influencing athletic potential and the probability of success in a specific sport. This assessment, when considered alongside technical/tactical, physical, functional, and psychosocial factors, provides a comprehensive perspective on an athlete's capabilities and prospects (Bernal-Orozco et al., 2020).

Understanding what makes up your body, like how much muscle and fat you have, is important for assessing your health and fitness. Several techniques are available to measure

body composition. Some involve taking skinfold measurements at specific locations on your body, while others use a measuring tape to determine the circumference of different body parts. Underwater weighing measures your weight in water to calculate body density, while bioelectrical impedance sends a small electrical signal through your body to estimate body fat. The Bod Pod uses air to measure your body volume, and DEXA scans employ X-rays to assess bone density and estimate fat and muscle proportions. These methods provide valuable insights into your body composition, helping you track changes over time and make informed decisions about your health and fitness goals.

METHODOLOGY

The study involved sixty-eight (N=68) female physical education students (35 from B.P.Ed. program and 33 from M.P.Ed. program). The students were selected from the Indira Gandhi Institute of Physical Education and Sports Sciences, University of Delhi, New Delhi. The body fat percentage was determined by measuring the girth in specific body sites using a standard measuring tape. The girth measurements were taken at the upper arm, hip, and wrist. The student's age was also considered for the calculation. Using the table, (R.B. Lambson, 1987) the subject's age and girth measurements for the selected sites were located and the corresponding constant values for each girth measurement and age were also identified. These constant values were then used to calculate the body density (BD) by using the below given formula:

$$BD = A - B - C + D \text{ (R.B. Lambson, 1987)}$$

Using the derived body density, the percent body fat (%F) was calculated according to the given equation:

$$\%F = (495 / BD) - 450 \text{ (Siri, 1956).}$$

These measurements and calculations provide valuable information about body composition and can assist in assessing overall health and fitness levels. (W.K. Hoeger, S.A. Hoeger, 2010)

STATISTICAL ANALYSIS

For the purpose of the study descriptive statistics (mean and standard deviation) were employed. Further to find out any significant difference between the B.P.Ed and M.P.Ed students in the body composition, t-test was used. The level of significance was set at 0.05 levels.

RESULTS

The descriptive statistics of the Body Mass Index, Body Fat %, Lean Body Mass, Fat Mass and WHR of B.P.Ed and M.P.Ed students are presented in Table-1.

Table-1**Descriptive Statistics of BMI, Body Fat %, Lean Body Mass, Fat Mass and WHR of Female B.P.Ed Students**

	B.P.ED. (35)	
	Mean	S.D.
BMI	21.86	3.13
Body Fat %	21.55	6.66
Lean Body Mass	43.74	5.02
Fat Mass	12.62	6.41
WHR	0.73	0.051

The table number 1 above depicts the descriptive statistics related to the selected body composition parameters of female B.P.Ed students.

- The mean and standard deviation values obtained for the BMI in the B.P.Ed students was 21.86 ± 3.13 .
- The mean and standard deviation values obtained for the Body Fat % in the B.P.Ed students was 21.55 ± 6.66 .
- The mean and standard deviation values obtained for the Lean Body Mass in the B.P.Ed students was 43.74 ± 5.02 .
- The mean and standard deviation values obtained for the Fat Mass in the B.P.Ed students was 12.62 ± 6.41 .
- The mean and standard deviation values obtained for the WHR in the B.P.Ed students was 0.73 ± 0.051 .

Table-2
Descriptive Statistics of BMI, Body Fat %, Lean Body Mass, Fat Mass and WHR of
Female M.P.Ed Students

	M.P.ED. (33)	
	Mean	S.D.
BMI	21.92	2.42
Body Fat %	21.23	6.32
Lean Body Mass	45.19	6.02
Fat Mass	12.46	4.90
WHR	0.75	0.047

The table number 2 above depicts the descriptive statistics related to the selected body composition parameters of female M.P.Ed students.

- The mean and standard deviation values obtained for the BMI in the M.P.Ed students was 21.92 ± 2.42 .
- The mean and standard deviation values obtained for the Body Fat % in the M.P.Ed students was 21.23 ± 6.32 .
- The mean and standard deviation values obtained for the Lean Body Mass in the M.P.Ed students was 45.19 ± 6.02 .
- The mean and standard deviation values obtained for the Fat Mass in the M.P.Ed students was 12.46 ± 4.90 .
- The mean and standard deviation values obtained for the WHR in the M.P.Ed students was 0.73 ± 0.047 .

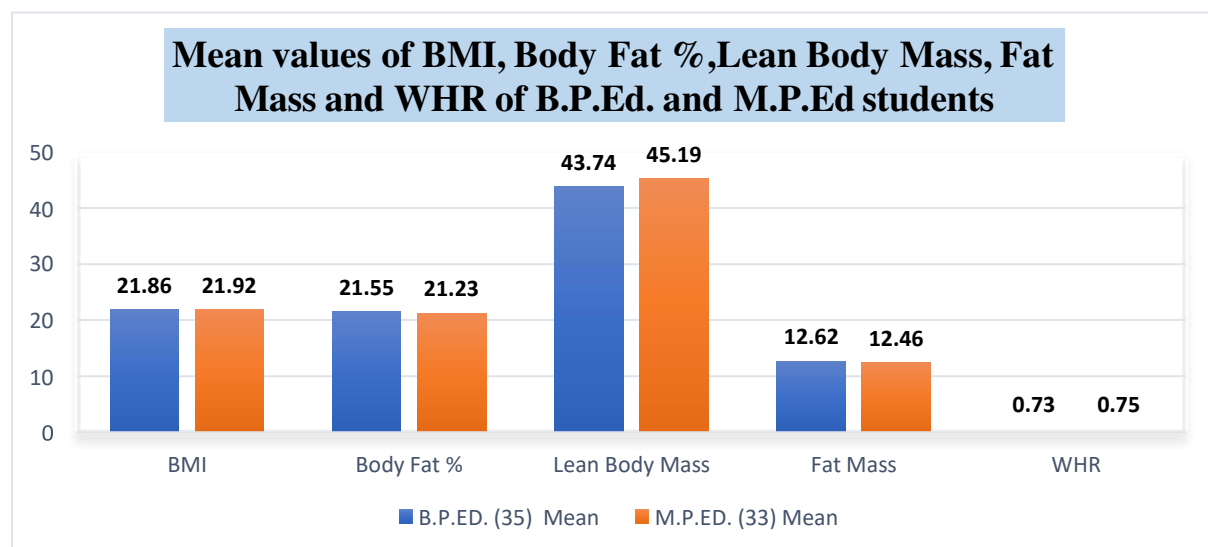
Table-3
Comparison of BMI, Body Fat %, Lean Body Mass, Fat Mass and WHR Between
Female B.P.Ed. and M.P.E.D. Students

	t-test for equality of means					
	F	Sig.	t	Sig.(2-tailed)	Mean difference	Std. error difference
BMI	1.73	.19	-.086	.93	-.058	.683

Body Fat %	.81	.369	.202	.84	.31	1.57
Lean Body Mass	.14	.707	-1.08	.28	-1.45	1.34
Fat Mass	.85	.35	.11	.91	.37	1.36
WHR	.66	.41	-1.5	.12	-.018	.012

The table number 3 above depicts the significant differences if any in the body composition parameters between B.P.Ed and M.P.Ed female students. There were no significant differences obtained in the BMI, Body fat %, Lean body mass, Fat mass and WHR between the selected groups, as the t value obtained for BMI was -0.086, Body fat % was 0.202, Lean body mass was -1.08, Fat mass was 0.11, and for WHR was -1.5, whereas the p value obtained for BMI was 0.93, Body fat % was 0.84, Lean body mass was 0.28, Fat mass was 0.91, and for WHR was 0.12 therefore all the values of p are more than 0.05.

Graphical representation of the mean values of BMI, Body Fat %, Lean Body Mass, Fat Mass and WHR of B.P.Ed. and M.P.Ed students.



DISCUSSION OF FINDINGS

The findings of this study indicate that there were no significant differences obtained in the selected physiological parameters (Body Mass Index, Body Fat %, Lean Body Mass, Waist Hip Ratio, and Fat Mass) between female students in the B.P.Ed and M.P.Ed programs.. The hypothesis stating that there would be no significant difference in these physiological parameters between the two groups was accepted. The probable reason for no significant differences obtained between the two groups could be that both the groups were pursuing physical education curriculum that included activity classes and sports participation and

training for competition. It is known that engaging in regular physical activity can have a positive impact on body composition. The physiological data obtained from both groups fell within the normal range, indicating that the participants had healthy body composition profiles. These findings have implications for physical education programs and highlight the importance of regular participation in sports for maintaining healthy body composition.

CONCLUSION

Based on the analysis of data and findings of the study, it could be concluded that there were no significant difference obtained in Body Mass Index (BMI), Waist Hip Ratio (WHR), Body Fat %, Lean Body Mass (LBM) and Fat Mass between female B.P.Ed and M.P.Ed students, it could be due to the common physical education curriculum that include activity, sports participation and training for competition that could have had a positive effect in the body composition of the students.

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